

IN THE CLAIMS:

1 (Original). A control system for a food product slicer including a rotatable slicing knife and a food product carriage mounted for movement back and forth past the slicing knife, the control system comprising:

a motor having a rotating output;

a multi-link drive arrangement connected between the rotating output of the motor and the food product carriage for moving the carriage during motor operation, a pivot link of the multi-link drive arrangement having a stationary axis, the pivot link pivoting back and forth about the stationary axis during motor operation;

an encoder arrangement associated with the pivot link and including a mask element, a light source and a photo-detector, the mask element including a plurality window regions distributed thereon, the light source positioned for directing light at the window regions of the mask element sequentially during pivoting movement of the pivot link and the photo-detector positioned to receive light directed at the window regions by the light source, the photo-detector providing output signals responsive to receipt/non-receipt of light emitted by the light source; and

a controller receiving the photo-detector output signals and responsively tracking movement of the food product carriage.

2 (Original). The control system of claim 1 wherein a position of the mask element is fixed and both the light source and the photo-detector are operatively coupled for pivoting movement with the pivot link.

3 (Original). The control system of claim 1 wherein a position of the light source is fixed and a position of the photo-detector is fixed, and the mask element is operatively coupled for movement with the pivot link.

4 (Original). The control system of claim 1 wherein the multi-link drive arrangement comprises a four link arrangement.

5 (Original). The control system of claim 1 wherein a slicing operation is defined by repeated slicing strokes and return strokes of the food product carriage, each slicing stroke defined by movement of the food product carriage from a first position to a second position and each return stroke defined by movement of the food product carriage from the second position back to the first position, the controller operatively connected for controlling a speed

of motor rotation and thus a speed of food product carriage movement, and during the slicing operation the controller operates to effect motor rotation so as to move the food product carriage at a first average speed for slicing strokes and at a second average speed for return strokes, wherein the first average speed is less than the second average speed.

6 (Original). The control system of claim 5 wherein the controller operates to effect motor rotation so as to slow movement of the food product carriage as the food product carriage approaches the second position during each slicing stroke.

7 (Original). The control system of claim 1 wherein the pivot link pivots back and forth between a first position and a second position, the photo-detector, light source and mask element are arranged to provide alignment between the light source, one of the plurality of openings and the photo-detector when the pivot link is at the first position, the controller operable to detect a change in direction of movement of the food product carriage based upon an output signal of the photo-detector when the pivot link is in the first position.

8 (Original). The control system of claim 7, wherein the output signal of the photo-detector when the pivot link is in the first position includes at least one signal characteristic which identifies the first position.

9 (Original). The control system of claim 1 wherein the controller counts at least pulse signals output by the photo-detector in order to track movement of the food product carriage.

10 (Original). The control system of claim 9 wherein the controller counts both pulse signals and regions between the pulse signals in order to track movement of the food product carriage.

11 (Original). The control system of claim 9, further comprising a carriage sensor for detecting positioning of the food product carriage at at least one of a slicing stroke starting position of the food product carriage and a slicing stroke completed position of the food product carriage, an output of the carriage sensor provided to the controller and the controller responsively resetting its tracking operation when the food product carriage is sensed by the carriage sensor.

12 (Original). The control system of claim 1 wherein the window regions allow light to pass through the mask element and the light source is positioned on one side of the mask element and the photo-detector is positioned on an opposite side of the mask element.

13 (Original). The control system of claim 1 wherein the window regions reflect light and both the light source and the photo-detector are positioned on a similar side of the mask element.

14 (Original). The control system of claim 1 wherein the light source and the photo-detector are connected to a PC board.

15 (Original). The control system of claim 1 wherein the mask element is formed as a curved mask element.

16 (Original). The control system of claim 1 wherein the mask element is formed with one or more bends therein.

17 (Original). The control system of claim 1 wherein the controller receives an input from a combination start/pause switch and is operable to begin a slicing operation when the combination start/pause switch is triggered prior to slicing, and the controller is operable to pause a slicing operation when the combination start/pause switch is triggered during slicing.

18 (Original). A control system for a food product slicer including a rotatable slicing knife and a food product carriage mounted for movement back and forth past the slicing knife, the control system comprising:

- a motor having a rotating output;

- a multi-link drive arrangement connected between the rotating output of the motor and the food product carriage for moving the carriage during motor operation, a pivot link of the multi-link drive arrangement having a stationary axis, the pivot link pivoting back and forth about the stationary axis during motor operation;

- an encoder arrangement including an arcuate mask element, a light source and a photo-detector, an axis of the arcuate mask element being substantially coincident with the stationary axis, the arcuate mask element including a plurality of openings thereon, the light source positioned to one side of the arcuate mask element and the photo-detector positioned to an opposite side of the arcuate mask element, the mask element operatively coupled for pivoting movement with the pivot link, the photo-detector outputting signals responsive to receipt/non-receipt of light emitted by the light source and passing through the openings in the arcuate mask element.

19 (Original). The control system of claim 18, further comprising:

- a controller receiving the photo-detector signals and responsively tracking movement of the food product carriage.

20 (Original). The control system of claim 19 wherein a slicing operation is defined by repeated slicing strokes and return strokes of the food product carriage, each slicing stroke defined by movement of the food product carriage from a first position to a second position and each return stroke defined by movement of the food product carriage from the second position back to the first position, the controller operatively connected for controlling a speed of motor rotation and thus a speed of food product carriage movement, and during the slicing operation the controller operates to effect motor rotation so as to move the food product carriage at a first average speed for slicing strokes and at a second average speed for return strokes, where the first average speed is less than the second average speed.

21 (Original). The control system of claim 19 wherein the controller counts at least pulse signals output by the photo-detector in order to track movement of the food product carriage.

22 (Original). The control system of claim 21 wherein the controller counts both pulse signals and regions between the pulse signals in order to track movement of the food product carriage.

23 (Original). The control system of claim 22, further comprising a carriage sensor positioned for detecting one of a slicing stroke starting position of the carriage and a slicing stroke completed position of the carriage, an output of the carriage sensor provided to the controller and the controller responsively resetting its tracking operation when the food product carriage is sensed by the carriage sensor.

24 (Original). The control system of claim 18 wherein the multi-link drive arrangement comprises a four link arrangement.

25 (Original). The control system of claim 18 wherein the light source and the photo-detector are connected to a PC board.

26-30 (Canceled).

31 (New). A control system for a food product slicer including a rotatable slicing knife and a food product carriage mounted for movement back and forth past the slicing knife, the control system comprising:

- a motor having a rotating output;

- a multi-link drive arrangement connected between the rotating output of the motor and the food product carriage for moving the carriage during motor operation, a pivot link of

the multi-link drive arrangement having a stationary axis, the pivot link pivoting back and forth about the stationary axis during motor operation;

an encoder arrangement associated with the pivot link and including a first part that moves back and forth with the pivot link and a second part that remains stationary during movement of the pivot link, one of the first part and the second part producing a signal output responsive to movement of the pivot link; and

a controller receiving the signal output and responsively tracking movement of the food product carriage.

32 (New). The control system of claim 31 wherein the second part provides the output signals.

33 (New). The control system of claim 1 wherein one of the first part and the second part includes a light source.

34 (New). The control system of claim 33 wherein the other of the first part and the second part includes a windowed mask element.

35 (New). A control system for a food product slicer including a rotatable slicing knife and a food product carriage mounted for movement back and forth past the slicing knife, the control system comprising:

a motor having a rotating output;

a drive arrangement connecting the rotating output to the food product carriage for movement thereof;

an encoder arrangement including a first part that moves with part of the drive arrangement and a second part that remains stationary during movement of the part of the drive arrangement, one of the first part and the second part providing a signal output responsive to movement of the pivot link; and

a controller receiving the signal output and responsively tracking movement of the food product carriage.

36 (New). The control system of claim 35 wherein at least one of the first part and the second part is a linear element.

37 (New). The control system of claim 36 wherein the encoder arrangement is a Hall effect type.

38 (New). The control system of claim 37 wherein the second part is a linear member and the encoder arrangement is a Hall effect type.

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